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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,401	03/02/2004	Yuzuru Fukushima	09792909-5824	2557

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EXAMINER

ALEJANDRO, RAYMOND

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

12/24/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/791,401

Applicant(s)

FUKUSHIMA ET AL.

Examiner

Raymond Alejandro

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 8 and 9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2 and 8-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(c) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/01/08 has been entered.

This communication is provided in response to the amendment filed in connection with the above-mentioned RCE. The art rejections as previously applied in the prior office action have been overcome by the applicant. Refer to the abovementioned amendment for substance of applicant's rebuttal arguments and remarks. However, all amended claims are again rejected over newly discovered references or new grounds of rejection as posited *infra* on the written record:

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. The language "*said electrolytic solution contains 95 wt % or more of a combination of ethylene carbonate and propylene carbonate*" in combination with the recitation "*vinylethylene carbonate and its derivatives in the range of 0.05 wt % to 5 wt % in total*" in claims 1 and 8 is

confusing, thereby rendering the scope of the claims indefinite. It should be noted that the limitation “95 wt % or more” may include 100 % as an upper limit. Thus, the foregoing limitation also may read on free of vinylethylene carbonate (or its derivatives) or “0 wt %” thereof at all” (See MPEP 2173.05(c) Numeral Ranges & Amounts Limitations, II. Open-Ended Numerical Ranges).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-2 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese publication JP 2002-15771 (heretofore the JP'771) in view of Coowar 2004/0048165.

The objective of the present application is aimed at an electrolyte wherein the disclosed inventive concept comprises the specific electrolyte composition.

As to claims 1 and 8:

The JP'771 discloses a non-aqueous electrolyte secondary cell and a non-aqueous electrolyte (TITLE). The cell comprises a positive electrode, a negative electrode and a non-aqueous electrolyte (P0045-0046, 0014, 0065, 0074/Abstract/CLAIM 7). The electrolyte comprises a mixture of solvents including ethylene carbonate (EC), propylene carbonate (PC), γ -butyrolactone (BL), vinylethylene carbonate (VEC), vinylene carbonate, ethylene sulfate, phenylethylene carbonate, tetraethylene glycol dimethyl ether (ABSTRACT/P0099, 0100, 0101). Specifically, the JP'711 is concerned with a mixture of multiple solvents including a 4th and/or 5th component (CLAIMS 1-3). VEC can be the 5th component (P0130).

(Emphasis added→) The JP'771 discloses the use of a gelled polymer electrolyte holding the electrolyte containing the electrolyte solution comprising solvents (P0040, 0056-0057, 0006, 0154). Additionally, disclosed therein is the use of at least ethylene carbonate (EC) and propylene carbonate (PC) in a combined amount of up to 85 % vol. (ABSTRACT, P0009, 0013, 0015, 0018, 0036, 0100-0101, CLAIM 1). *EC and PC are recognized in the art as high dielectric constant solvents.*

The electrolyte solution comprises solvents and a Li-salt such as LiClO₄ (P 0131 & 0096).

Table 5 shows an electrolyte solution comprising EC, PC, BL and VEC, wherein the weight percent of vinyl ethylene carbonate (VEC) ranges from 0.5-5 % (See TABLE 5). Further disclosed is the specific reasons for adding vinyl ethylene carbonate in the specified amount (P104, 0125). *Thus, the JP'771 teaches the claimed wt % range of VEC with sufficient specificity.*

Additionally, it is disclosed the use of polyacrylonitrile (PAN) or polyvinylidene fluoride (PVdF) in the non-aqueous electrolyte (P0057, 0154).

Two approaches:

- *the JP'771 discloses the claimed high molecular weight compound because it at once envisages combining an additional 4th and/or 5th component. In this case, either the 4th or the 5th component represents the high molecular weight compound.*
- *The JP'771 meet the claimed requirement because it discloses the use of polyacrylonitrile (PAN) or polyvinylidene fluoride (PVdF) in the non-aqueous electrolyte (P0057)*

The electrolyte comprises a mixture of solvents including ethylene carbonate (EC), propylene carbonate (PC), γ -butyrolactone (BL), vinyl ethylene carbonate (VEC), vinylene carbonate, ethylene sulfate, phenylethylene carbonate, tetrathylene glycol dimethyl ether (ABSTRACT/P0099, 0100, 0101). **Table 5** shows an electrolyte solution comprising EC, PC, BL and VEC, wherein the weight percent of vinyl ethylene carbonate ranges from 0.5-5 % (See TABLE 5).

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As to claims 2 and 9:

EXAMPLE 39, among other, in **TABLE 5** shows about 50:50 % ratio of EC and PC.

Other examples (See **EXAMPLES 35-38 and 40-44**) also show EC/PC ratio within the claimed ratio range.

The JP'771 describes an electrolyte and a battery comprising an electrolyte system as disclosed hereinabove. However, the preceding prior art reference does not expressly disclose the specific weight percent of the ethylene carbonate and propylene carbonate.

Coowar discloses an electrolyte for a secondary cell (TITLE) wherein the electrolyte comprises an electrolyte membrane (P0018-0022) made up of organic solvent that acts as a plasticizer which comprises propylene carbonate and ethylene carbonate and about 1.8 by weight % of an additive (P0022). In particular, there is disclosed that the electrolyte consists of 3 parts ethylene carbonate and 2 parts propylene carbonate (by weight) to which is added a small proportion of an additive in the amount of 1.0 % by weight, or 1.78 % by weight or 5 % by weight (P0026, and FIGURES 2a, 2b and 2c). *Thus, if the added amount of the additive is 1.8 wt %, then the content of both propylene carbonate and ethylene carbonate must be 98.2 wt %. Similarly, if the added amount of the additive is 1.0 wt %, or 1.78 wt % or 5 wt %, then the content of both propylene carbonate and ethylene carbonate must be 99.0 wt %, 98.22 wt % or, 95.0 wt %, respectively.*

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the field of the invention to employ the specific weight percent of the ethylene carbonate and propylene carbonate of Coowar in the electrolyte system of the JP'771 as Coowar teaches that combining the specifically disclosed amount of ethylene carbonate and propylene

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carbonate with an additive in the battery electrolyte has a beneficial effect on cell performance, both in reducing the voltage of the electrode relative to the lithium, and in considerably reducing the irreversible loss of capacity. As to the specific weight percent of the organic solvents (i.e. ethylene carbonate and propylene carbonate), it would have been obvious to a person possessing a level of ordinary skill in the field of the invention to employ the specific weight percent of the organic solvents in the electrolyte solution as instantly claimed or any other amount thereof as both the JP'771 and Coowar themselves disclose that charging/discharging cycle, viscosity and ionic conductivity properties or cell performance (voltage and capacity) (*See JP'771 at paragraphs 0100-0101 & 0003 & Coowar P0026*) are affected when the amount or content of organic solvents in the electrolyte solution is varied or changed. Thus, both the JP'771 and Coowar recognize the specific weight percent of the organic solvents in the electrolyte solution as a variable that achieves a recognized result (*i.e. capable of varying the charge/discharge cycle, viscosity and ionic conductivity characteristics*) *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See also *Peterson*, 315 F.3d at 1330, 65 USPQ2d at 1382; and *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). Hence, it is prima-facie obvious to select an optimized weight of the organic solvents in the electrolyte solution in order to obtain an electrolyte solution exhibiting suitable charging/discharging, viscous and ionic conductive properties and cell performance (voltage and capacity). Additionally, generally speaking, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re*

Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it is prima-facie obvious to choose or select the specific amount of the organic solvents. *See MPEP 2144.05 Obviousness of Ranges.*

8. Claims 1-3, 5-10 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese publication JP 2002-15771 (heretofore the JP'771) in view the Japanese publication JP 2001-057234 (herein called the JP'234).

to claims 1 and 8:

The JP'771 discloses a non-aqueous electrolyte secondary cell and a non-aqueous electrolyte (TITLE). The cell comprises a positive electrode, a negative electrode and a non-aqueous electrolyte (P0045-0046, 0014, 0065, 0074/Abstract/CLAIM 7). The electrolyte comprises a mixture of solvents including ethylene carbonate (EC), propylene carbonate (PC), γ -butyrolactone (BL), vinyl ethylene carbonate (VEC), vinylene carbonate, ethylene sulfate, phenylethylene carbonate, tetraethylene glycol dimethyl ether (ABSTRACT/P0099, 0100, 0101). Specifically, the JP'711 is concerned with a mixture of multiple solvents including a 4th and/or 5th component (CLAIMS 1-3). VEC can be the 5th component (P0130).

(Emphasis added→) The JP'771 discloses the use of a gelled polymer electrolyte holding the electrolyte containing the electrolyte solution comprising solvents (P0040, 0056-0057, 0006, 0154). Additionally, disclosed therein is the use of at least ethylene carbonate (EC) and propylene carbonate (PC) in a combined amount of up to 85 % vol. (ABSTRACT, P0009, 0013, 0015, 0018, 0036, 0100-0101, CLAIM 1). *EC and PC are recognized in the art as high dielectric constant solvents.*

The electrolyte solution comprises solvents and a Li-salt such as LiClO₄ (P 0131 & 0096).

Table 5 shows an electrolyte solution comprising EC, PC, BL and VEC, wherein the weight percent of vinyl ethylene carbonate (VEC) ranges from 0.5-5 % (See TABLE 5). Further disclosed is the specific reasons for adding vinyl ethylene carbonate in the specified amount (P104, 0125). *Thus, the JP'771 teaches the claimed wt % range of VEC with sufficient specificity.*

Additionally, it is disclosed the use of polyacrylonitrile (PAN) or polyvinylidene fluoride (PVdF) in the non-aqueous electrolyte (P0057, 0154).

Two approaches:

- *the JP'771 discloses the claimed high molecular weight compound because it at once envisages combining an additional 4th and/or 5th component. In this case, either the 4th or the 5th component represents the high molecular weight compound.*
- *The JP'771 meet the claimed requirement because it discloses the use of polyacrylonitrile (PAN) or polyvinylidene fluoride (PVdF) in the non-aqueous electrolyte (P0057)*

The electrolyte comprises a mixture of solvents including ethylene carbonate (EC), propylene carbonate (PC), γ -butyrolactone (BL), vinyl ethylene carbonate (VEC), vinylene carbonate, ethylene sulfate, phenylethylene carbonate, tetraethylene glycol dimethyl ether (ABSTRACT/P0099, 0100, 0101). **Table 5** shows an electrolyte solution comprising EC, PC, BL and VEC, wherein the weight percent of vinyl ethylene carbonate ranges from 0.5-5 % (See TABLE 5).

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As to claims 2 and 9:

EXAMPLE 39, among other, in **TABLE 5** shows about 50:50 % ratio of EC and PC.

Other examples (See **EXAMPLES 35-38 and 40-44**) also show EC/PC ratio within the claimed ratio range.

The JP'771 describes an electrolyte and a battery comprising an electrolyte system as disclosed hereinabove. However, the preceding prior art reference does not expressly disclose the specific weight percent of the ethylene carbonate and propylene carbonate.

The JP'234 discloses a non-aqueous electrolyte and a non-aqueous electrolyte secondary battery wherein the non-aqueous electrolyte is composed of 95 wt % of cyclic carbonate solvents such as propylene carbonate (PC) and/or ethylene carbonate (EC) (P0025-0026, 0003, Abstract) to improve the life of a battery and the leakage current value (ABSTRACT). *EC and PC are recognized in the art as high dielectric constant solvents.* JP'234 also discloses **LiClO₄** (P0003 & 0021).

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the field of the invention to employ the specific weight percent of the high dielectric constant solvent of the JP'234 in the electrolyte solution of the JP'771 because the JP'234 teaches that such an amount (weight percent) of the high dielectric constant solvent in the electrolytic solution allows to improve the life of a battery and the leakage current value.

Moreover, both the JP'771 and the JP'234 discloses that charging/discharging cycle, viscosity and ionic conductivity properties (See JP'771 at paragraphs 0100-0101 & 0003) and/or the life of a battery and the leakage current value (See JP'237 at P0025-0026, 0003, Abstract) are controlled or affected when the amount or content of high dielectric constant

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solvents in the electrolyte solution is varied or changed. Thus, both the JP'771 and the JP'234 recognize the specific weight percent of the high dielectric constant solvents in the electrolyte solution as a variable that achieves a recognized result (*i.e. capable of varying the charge/discharge cycle, viscosity and ionic conductivity characteristics; and/or batter life and leakage current value*) *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See also *Peterson*, 315 F.3d at 1330, 65 USPQ2d at 1382; and *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). Hence, it is prima-facie obvious to select an optimized weight of the high dielectric constant solvents in the electrolyte solution in order to obtain an electrolyte solution exhibiting suitable charging/discharging, viscous and ionic conductive properties. Additionally, generally speaking, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it is prima-facie obvious to choose or select the specific amount of the high dielectric constant solvents. *See MPEP 2144.05 Obviousness of Ranges*.

Response to Arguments

1. Applicant's arguments, submitted on 12/01/08, with respect to all pending claims have been considered but are moot in view of the new ground(s) of rejection.
2. As for applicant's arguments against the JP'771, individually or in combination with the JP'234, it is contended that the high chemical stability and high capacity leading to less swelling of the container attributable to the specific weight ratio of ethylene and propylene carbonate in

addition to vinylethylene carbonate is also attained in the electrolyte and battery system of the prior art because the art of record discloses the same electrolyte system (components) in a substantially similar mixed amount. In fact, the JP'771, when taken alone, shows an amount of up 85 % volume which is close enough to applicant's claimed range; on the other hand, the JP'771 in combination with JP'234 shows specifically the same electrolyte composition in terms of both components and specific weight content. Therefore, both electrolytes (JP'771, individually; or the JP'771 in combination with JP'234) are capable of behaving in the same manner that applicant's electrolyte composition does for purposes of swelling, capacity and/or chemical stability. So far, applicant has not come forward with objective, sound or scientific evidence demonstrating that his/her electrolyte composition exhibits superior characteristics when compared to the electrolyte composition of the prior art. Burden of proof is on applicant. A vis-à-vis comparison between the disclosed electrolyte system and applicant's electrolyte system to show the existence of significantly statistical difference, if any, has not been presented for a factual determination of patentability.

To further support the position taken by the Examiner, it is noted that both the JP'771 and the JP'234 recognize the specific weight percent of the high dielectric constant solvents in the electrolyte solution as a variable that achieves a recognized result (*i.e. capable of varying the charge/discharge cycle, viscosity and ionic conductivity characteristics; and/or batter life and leakage current value*) In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See also Peterson, 315 F.3d at 1330, 65 USPQ2d at 1382; and In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). Hence, it is prima-facie obvious to select an optimized weight of the high

dielectric constant solvents in the electrolyte solution in order to obtain an electrolyte solution exhibiting suitable charging/discharging, viscous and ionic conductive properties.

Additionally, generally speaking, differences in concentration will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it is prima-facie obvious to choose or select the specific amount of the high dielectric constant solvents. ***See MPEP 2144.05 Obviousness of Ranges.***

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Raymond Alejandro/
Primary Examiner, Art Unit 1795